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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/808,111

03/24/2004

Christian L. Belady

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EXAMINER

DATSKOVSKIY, MICHAEL V

ART UNIT

PAPER NUMBER

2835

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/808,111

Applicant(s)

BELADY ET AL.

Examiner

Michael V. Datskovskiy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28 and 29 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8,12 and 18-25 is/are rejected.
- 7) ☒ Claim(s) 3, 7, 9-11, 13-17, 26-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/05/2006 have been fully considered but they are not persuasive. Examiner does not agree with applicant's interpretation of the device by Kirshberg et al: Specifically, examiner does not agree with applicant's opinion that in the device by Kirshberg et al a second substrate 22 is not equivalent to semiconductor die. SEMATECH Dictionary of Semiconductor Terms interprets the term: "Semiconductor die" as " a small piece of silicone wafer, bounded by adjacent scribe lines in horizontal and vertical directions, that contains the complete device being manufactured (http://www.sematech.org/resources/publishing/dictionary/df_to_dz.htm), which description is fully supported by Kirshberg et al: In col. 1, lines 46-47 Kirshberg et al describe their device as: "...a two-substrate structure in which one substrate can be an integrated circuit substrate to be cooled". According to the further description this integrated circuit substrate to be cooled is a substrate 22, which includes etched grooves 24 and 26, said grooves are being a wicking structures for transporting a cooling liquid to the semiconductor die and a vapor to the condenser (See col. 3, lines 1-3, 8-10 and 65-67). A second plate 21 covers said grooves 24 and 26 thereby coforming an evaporator and a condenser. Examiner also does not agree with applicant's statement that in the device by Kirshberg et al a cooling fluid is not transferred away from the semiconductor die. On the contrary: In the device by Kirshberg et al as well as in the device by the current application a heated liquid (or vapor) is wicked away from the heat generating semiconductor die to the condenser,

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further comprising a heat sink (fins 14A in the current application), said heat sink being cooled by air. Based on the above the previous rejection over Kirshberg et al stays.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 4-6, 8, 12, 18-24 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Kirshberg et al (US Patent 6,976,527).

Kirshberg et al teach a loop thermosyphon system, Figs. 1-4, comprising:

a semiconductor die 22 (col. 3, lines 4-10 and 65-67) having a plurality of micro channels (grooves 24 and 26); a second plate 21 comprising a condenser 12 in fluid communication with grooves 24; said grooves 24 are shaped to create a wicking structure for preferential cooling fluid flow along one direction toward the condenser 12 and further toward heat generating region of the semiconductor die 21 (col. 2, lines 29-67).

Kirshberg et al teach furthermore said second plate 21 further comprising an input fluid conduit 16 for coupling fluid from the condenser 12 to the semiconductor die 22, said input conduit 16 having a wicking structure 26 being internal to said conduit 16.

Kirshberg et al teach furthermore said plate 22 is coupled with the die to seal the micro

channels such that fluid flows through the micro channels. Kirshberg et al teach furthermore said second plate 21 further comprising an output fluid conduit 14, for coupling fluid from the micro channels to the condenser thereby taking heat away from said semiconductor die 22 to the condenser 12 and further by an adjacent heat sink to air, wherein the wicking structure comprising thermally conductive material (col. 2, lines 41-60). Regarding to claims 22-24 and 25: The method steps are necessitated by the device structure as Kirshberg et al disclosed it.

Allowable Subject Matter

4. Claims 28-29 are allowed.
5. Claims 3, 7, 9-11, 13-17 and 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. The following is a statement of reasons for the indication of allowable subject matter: Said system further comprising: an input header (claim 3); an output header (claim 7); the wicking structure comprising copper (claim 9); the wicking structure being selected from the group comprising porous-like material, powder, fiber, screen and mixtures thereof (claims 10-11); said system further comprising: blocking material forming at least one orifice at an input to at least one micro channels (claims 13-14 and 26); the condenser being arranged above the die (claim 15); the system further comprising fluid-restrictive material at least one of the micro channels for preferential fluid flow along one direction (claims 16-17 and 27-29).

Conclusion


7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "Michael V Datskovskiy".

Michael V Datskovskiy
Primary Examiner
Art Unit 2835

12/28/2005